Hermissenda crassicornis

An opalescent aeolid nudibranch (Eschscholtz, 1831)

Phylum: Mollusca
Class: Gastropoda
Order: Nudibranchia
Family: Facelinidae

Description

Size—30 mm to 80 mm long (Beeman and Williams 1980); this specimen (Coos Bay) 50 mm.
Color—ground color often white, transparent, but can be yellow or green (MacFarland 1966), with opalescent white or blue line around foot, down each oral tentacle, and down back, where it is double and encloses 2 orange spots (McDonald 1975). Line can form diamond shape between first cerata. Cerata cores (digestive glands) brown or reddish; cerata tips orange, except for clear very tip: typical (Beeman and Williams 1980). These specimens with vertical white stripe on cerata. Many cerata color variations: rust, red, black, brown, green (Keen 1971).
Body—"aeolid"; an oblong, flat-bottomed form, with rhinophores, cerata, tail. but without posterior plume of branched gills (fig. 1).
Rhinophores—long; with 8 - 24 slanted, faint "leaves" or rings (Farmer 1980); "weakly perfoliate" (McDonald and Nybakken 1980) or annulate, otherwise solid (fig. 1). Color: as ground.
Foot—split in front ("anteriorly bilabiate") (Farmer 1980); lateral angles produced into horns (fig. 1); foot extends posteriorly into long, pointed tail. Foot corners or horns also called "pedal tentacles" (Kozloff 1974a).
Cerata—large, conical, in 11 clusters of transverse rows (Farmer 1980) covering animal's back. Cerata begin posterior to rhinophores (Beeman and Williams 1980), are longest in median region of 1st 2 groups (Behrens 1980). Each ceras with a core of digestive gland (fig. 1), and at tip a cnidosac, which collects nematocysts from cnidarian prey (MacFarland 1966).
Oral Tentacles—usually present, order Nudibranchia (McDonald 1975). Long, white, pointed (fig. 1).
Gills—none (fig. 1). Cerata serve as gills.
Eyes—small, black; posterior to bases of rhinophores (fig. 1). With only 5 large cells: used in neurological studies (Beeman and Williams 1980).
Radula and Jaws—ribbon of horseshoe-shaped teeth; each central cusp with a single row of up to 28 teeth; 4-6 sharp spines on either side of middle cusp, whose under surface has up to 15 small points (MacFarland 1966) (fig. 4).
Mouth—jaw border with up to 50 denticles (MacFarland 1966). (Mandibles not figured.)
Genital Openings—genital apertures on low posterior part of 1st group of cerata (MacFarland 1966) (not visible as drawn, but see arrow, fig. 1).
Anus—tubular, on right, between 2nd and 3rd groups of cerata (fig. 1) (MacFarland 1966). Concealed anus: tribe Cleioprocta (MacFarland 1966). Anus more anterior than in Aeolididae (Keen 1971).
Renal Pore—lateral, between 1st and 2nd troup of cerata (not visible, but see arrow, fig. 1).
Eggs—in pink sausage-like string; each 1 mm diameters, attached through much of its length to substrate. String makes tight counterclockwise spiral. Each capsule can have 1 – 4 eggs (Beeman and Williams 1980) (fig. 5).

Possible Misidentifications

Nudibranchs can be separated from other apparently shell-less opisthobranchs by their radulae and jaws (they are carnivorous), and by their rhinophores, which are not rolled as they are in sacoglossans. Nudibranchs also have oral tentacles. In addition, they have lost all shell and opercula (as adults) as well as mantle cavity and gills. (Some may have secondary gills on their backs (McDonald and Nybakken 1980)). Nudibranch genital openings are on the right side.

The nudibranchs in *Hermissenda*'s suborder, Aeolidiacea, are relatively small, long, and narrow, gill-less, and have cerata. They feed partly on cnidaria, and are able to store nematocysts in their cerata (Keen 1971).

The nudibranchs in the other major suborder, Doridacea, are larger, with a large flat foot, thick mantle and obvious gills (McDonald and Nybakken 1980). *i.e. Onchidoris, Triopha.*

Another suborder, Dendronotacea, resemble aeolids, but have sheaths for their rhinophores and a mid-lateral anus. Examples are *Tritonia, Tethys, Melibe,* and especially *Dendronotus* spp.

The Arminacea are a very diverse group lacking rhinophore sheaths and usually lacking oral tentacles; the anus is anterior. Some have cerata, some do not: *Janolus fuscus* has cerata very like *Hermissenda's* (orange and white tipped), but also has a red cockscomb between the rhinophores, which are colored like the cerata. Cerata begin anterior to the rhinophores and fall off easily; they are found only on the periphery of the dorsum (McDonald and Nybakken 1980). *Janolus* also lacks the blueish lines on the body found on *Hermissenda.* This species was formerly called *Antiopella barbaren*sis (Cooper, 1863).

Hermissenda's suborder, Aeolidacea, includes 2 superfamilies, Protoaeolidoidea, with one family, Notaeolidiidae, and Euaeolidoidea, with 21 families. Only a few species from this latter superfamily could be confused with *Hermissenda:*

Fiona pinnata is similar in morphology to *Hermissenda,* but has smooth rhinophores and sail-like flaps on its cerata. The cerata are dense along the margins; a large part of the back is clear (Keen 1971); it has no blue lines or orange spots. Cosmopolitan.

The Coryphellidae have produced foot corners, but not angular ones as in Facelinidae (Keen 1971). Their numerous cerata are clustered and elongate, as in *Hermissenda. Coryphella trilineata* has 3 white (not blue) lines on a white body, but there are no orange spots within them. The cerata can look much like *Hermissenda*'s*,* but have cadmium yellow tips. The rhinophores are annulate and colored yellow or orange.

Aeolidia papillosa, the shag rug nudibranch found with anemones, is white with gray to brown spots. It has sharp pedal tentacles like *Hermissenda,* but its cerata begin anterior to the rhinophores and are lanceolate, i.e. broad-based and sharp-tipped, not conical as in *Hermissenda.*

Spurillidae (genus *Spurilla)* have rhinophores with quite oblique leaves, and have orange head markings. The cerata of *S. olivae* are quite like *Hermissenda*'s*:* orange, white tipped brown cores. Both this species and *S. chromosoma* are found only from central California south however (McDonald and Nybakken 1980).

There are 2 other nudibranchs in the family Facelinidae (was Phidianidae (McDonald and Nybakken 1980)), of the genus *Phidiana;* both are found only from central California south: Both *P. hiltoni (=pugnax)* and *P. (Emarcusia?) morrowensis* have orange markings on the head and on the rhinophores. These 2 are closely related, but not likely to be confused with each other or with *Hermissenda.*

Several other nudibranchs of diverse families could resemble *Hermissenda* superficially in color, so care must be taken to observe carefully the rhinophores, foot tentacles, and especially the blue/white lines of *Hermissenda.*

Ecological Information

Range—Sitka, Alaska to Baja California (Beeman and Williams 1980).
Local Distribution—Coos Bay: small boat basin, Charleston, seasonally, especially in summer.
Habitat—varied: rocky tidepools as well as floats, mud and sand flats (Beeman and Williams 1980; Goddard 1985); eelgrass beds (Puget Sound); bare rock.
Salinity—collected at 30 ‰ (Coos Bay)
Temperature—annual range 9-18 degrees (Beeman and Williams 1980).
Tidal Level—low intertidal; subtidal down to 35m (Beeman and Williams 1980).
Associates—copepod *Hemicyclops thysanotus* often found on its back (Beeman and Williams 1980). Found on fouling panels regardless of presence of other organisms. Sea pen *Ptilosarcus* (Puget Sound (Birkeland 1974). Also see “Food”.

Quantitative Information

Weight—5-8 grams (Harrigan and Alkon 1978).
Abundance—one of the most common aeolids in northeastern Pacific, especially in middle of range; but its occurrence is temporally variable at any one part of the

range (Ricketts and Calvin 1971). Dominant littoral opisthobranch in abundance and geographical distribution, Humboldt Bay, California (Jaeckle 1984). Occurs in Puget Sound sea pen beds at densities up to 2-3/m^2 (Birkeland 1974).

Life History Information

Reproduction—hermaphroditic, but self-fertilization probably unlikely (Harrigan and Alkon 1978). Mating animals and egg masses found all year (Puget Sound) (Beeman and Williams 1980). Eggs on algae or *Zostera* blades. Egg-laying begins when animal is 45 days old, continues until death (in lab) at 128+ days (Harrigan and Alkon 1978). Motile sperm found in 34 mg animals, egg laying by 73 mg wild animals (in lab (Harrigan and Alkon 1978)). Violent lunging and biting behavior once thought to be aggressive only is now known to be part of brief mating sequence (Rutowski 1983); many attempts at copulalion unsuccessful. Sperm from one copulation enough to fertilize most eggs in about 3 egg masses (Rutowski 1983).
Growth Rate—obligatory veliger stage of at least 34 days; veligers hatch in 5-6 days in lab at 13-15 °C (Harrigan and Alkon 1978). Metamorphosis occurs when veligers are at least 300 µ and possess eyes, foot and enlarged propodium (Harrigan and Alkon 1978). Veligers can swim.
Longevity—average life span in lab 163 days (35 veliger + 128 day adult): a subannual species (Harrigan and Alkon 1978).
Food—a generalist: carnivore and scavenger. Eats hydroids, particularly in eelgrass; *Tubularia, Eudendrium, Sarsia* (Goddard 1985). Also small sea anemones, bryozoans, colonial ascidian *Aplidium,* botyrllid ascidians, annelids, small crustaceans and clams, dead animals. Will eat other *Hermissenda* (but probably only when other food not available Goddard 1985)). Subtidally in Puget Sound: sea pen *Ptilosarcus* (Birkeland 1974). In Humboldt Co., California, prey include anthomedusae, leptomedusae and chondrophore *Velella velella* (Jaeckl 1984). Veligers crawl on *Obelia,* a probable food (Harrigan and Alkon 1978).
Predators—-in rocky areas below Monterey, California, the large opisthobranch *Navanax inermis* (Beeman and Williams 1980). Seastar *Crossaster* (Puget Sound (Birkeland 1974)) prefers *Hermissenda* as summer food. Eggs eaten by sacoglossan *Olea hansineensis* (Crane,1971).
Behavior—very aggressive toward other nudibranchs and other *Hermissenda.* Head-on "combats" with the latter probably often part of mating sequence (see *Reproduction).* Small *Hermissenda* have a swimming escape response to seastar predator *Crossaster* (Birkeland 1974).

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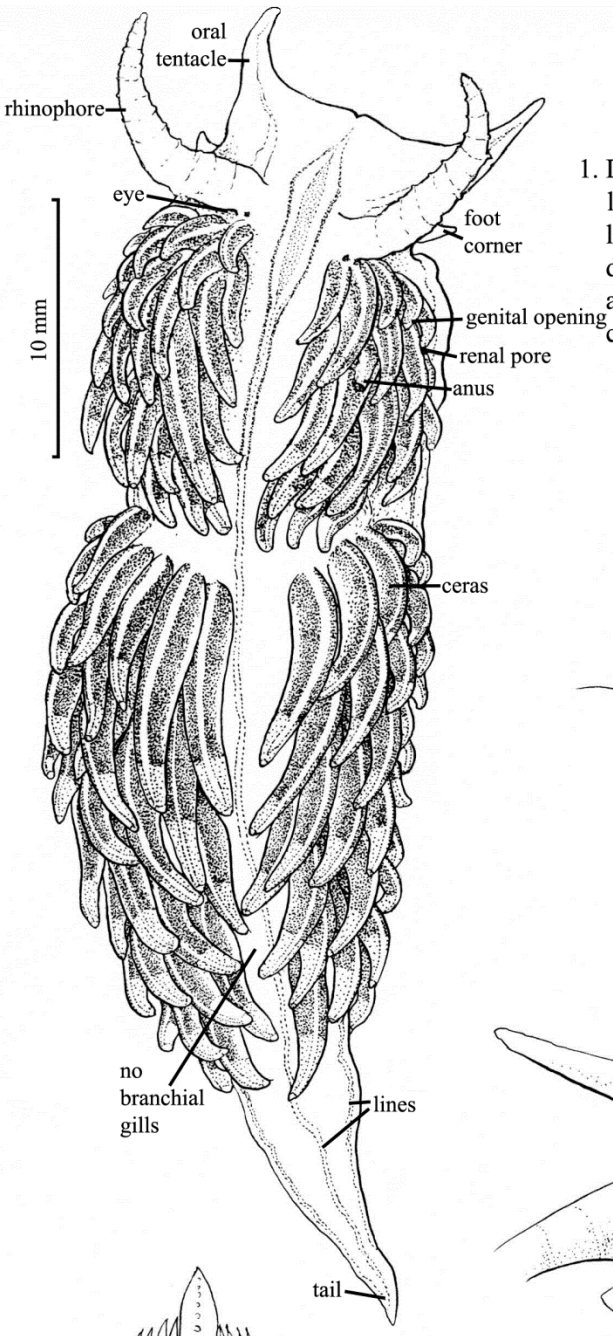
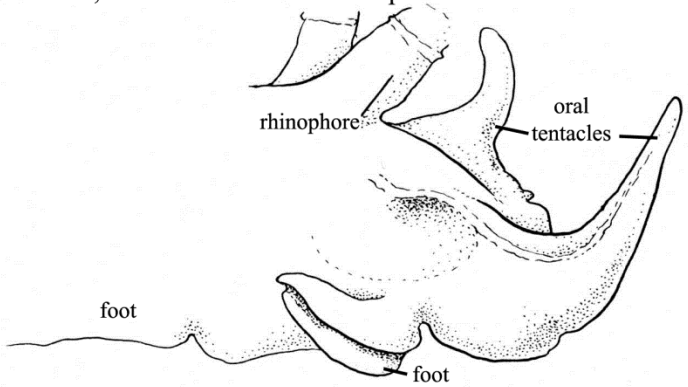
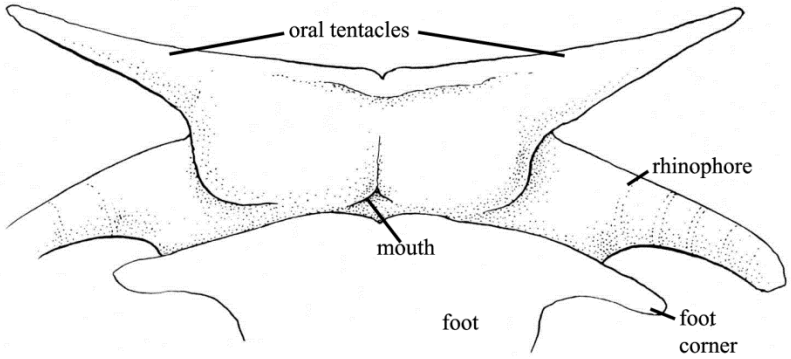


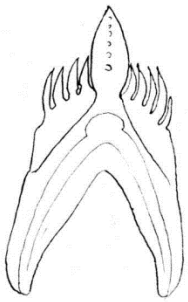
1. Dorsal view (L:50mm) x4:
long oral tentacles; prolonged foot corners; bluish-white line down oral tentacles, around dorsal edge along midline, doubling to enclose orange stripe. Rhinophores weakly annulate; cerata long, white tipped, with orange bands, brown cores, sometimes with white stripe.



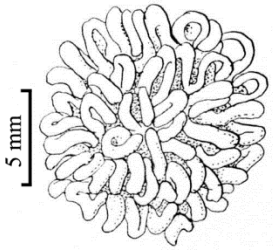
2. Anterior, lateral view

3. Anterior, ventral view





4. Radular tooth:
large middle cusp with 4-6 spines either side (from Marcus 1961).



5. Egg mass (D:12mm) x3:
sausage-like ribbon of pink capsules in counter-clockwise coil.